

Application No.: 09/898,463
Amendment under 37 CFR 1.111
Reply to Office Action dated July 12, 2005
October 12, 2005

AMENDMENTS TO THE SPECIFICATION

Please substitute the title to read as follows:

-- MEDICAL EXAMINATION SYSTEM FOR SCHEDULING AN APPOINTMENT
FOR PATIENTS --

Please substitute the paragraph beginning at page 1, line 13
and ending at page 1, line 23 to read as follows:

-- In a conventional medical examination system ~~that~~ , the
system controls the order of patients waiting for a medical
examination, ~~systems~~ . Systems or algorithms ~~that~~ which control
waiting lines, under the presupposition that patients have
already arrived at a fixed institution for a medical examination, ~~wherein~~
have been proposed. In these systems or algorithms, the
order is set so as to optimize the order of later arriving
patients waiting in line (Japanese Unexamined Patent Publication
No. Hei 08 -194853) or ~~wherein~~ the order is indicated (Japanese
Unexamined Patent Publication No. Hei 11-205337) ~~have been~~
~~proposed~~. These medical examination systems have configurations
that cannot, as a whole, be physically moved. --

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Please substitute the paragraph beginning at page 2, line 16 and ending at page 3, line 9 to read as follows:

-- Therefore, in conventional on-site medical examinations, these conventional systems for controlling waiting time have not been utilized. ~~Because~~ because an appointment cannot be made for the shortest medical examination time by grasping the medical examination condition during working hours and ~~because~~ also there is no portability nor is there guidance given to individual patients at the site. In most on-site medical examinations, an orientation paper including the time precisely arranged schedule according to an individual patient is not delivered in advance. No proper guidance is given at the site concerning the medical examination items or the examination site. Therefore, in many cases, considering the time needed for the actual medical examination, patients waste much time waiting after having arrived at the examination site and, in addition, waste time at a hastily arranged site by being confused concerning the order of the medical examination. --

Please substitute the paragraph beginning at page 7, line 6 and ending at page 11, line 9 to read as follows:

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-- In the following, an embodiment of the present invention is described in reference to the drawings. First, a conceptual diagram of the entire configuration of a medical examination system according to the present embodiment is described in reference to FIG. 1 so that the entire system can be grasped. In FIG. 1 ~~the~~ shows an entire site 1 of a medical examination ~~is denoted as 1~~, a server ~~is denoted as 11~~, medical examination items ~~are denoted as 12A to 12D~~ and personal computers (hereinafter referred to as PCs) that have wireless interfaces installed at the site of each of the medical examination items ~~are denoted as 12A1 to 12D1~~. The server 11 has a scheduler 111 that includes a waiting queue means 114 for individual medical examination items and a waiting queue means 115 for individual patients and the function of a wireless communication means. A plurality of virtual reality displays 112 ~~that~~ form guidance information for receiving the medical examination which mainly include the appointment contents of the scheduler 111 ~~are denoted as 112 and portable-type~~. Portable-type wireless display devices ~~corresponding 113~~ correspond to virtual reality displays ~~are denoted as 113~~. The patients go around the medical examination site carrying a wireless display device 1131 or 1132, respectively.

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Here, in FIG. 1, an office room 2 is located in a place away from the site 1 of the medical examination ~~is denoted as 2~~ where PCs 21, 22 and 23 are personal computers installed within the office room 2. Those PCs 21, 22 and 23 are connected with the server 11 installed at the site 1 of the medical examination via a network so as to have a configuration where the progress of the medical examination can be confirmed or an appointment can be ~~made~~ scheduled while staying in the office room 2.

In FIG. 1, in the case that the medical examination is carried out where the site 1 thereof is installed at a local public office, or the like, ~~each home of a farmer is denoted as 3 and PCs installed in each home 3 are denoted as 31 and 32. The PCs 31 and 32~~ installed in each home 3 are connected with the server 11 installed at the site 1 of the medical examination via a network so that the progress of the medical examination can be confirmed and an appointment can be ~~made~~ scheduled while staying at home in the same manner as above.

Next, the configuration of a scheduler of the present embodiment is described in detail. FIG. 2 shows a detailed configuration example of a waiting queue means 114 for individual medical examination items of the scheduler 111 shown in FIG. 1. In FIG. 2, idn ($n = 3, 4, 5, 6, 7$) represents an id for identifying each patient. The waiting queue means 114 for

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individual medical examination items manages waiting line queue 114Q of the patients for each of the medical examination items 12A to 12D. In addition, the average medical examination times per patient at each of the medical examination items 12A to 12D are denoted as T_a to T_d . T_{wa} to T_{wd} represent time periods when the next appointment can be ~~made~~ scheduled for each of the medical examination items 12A to 12D, and also represent the time periods of empty queues (hereinafter referred to as an empty id) wherein the first patient is not specified in the waiting queue for individual medical examination items or represents the time period immediately after the completion time of the final patient in the waiting queue means for individual medical examination items, in the case that no empty id exists. In addition, in FIG. 2 arrows between patients id5 and id6 and between patients id6 and id7 of the medical examination item 12A indicate the respective medical examination times are separated from each other and no arrows indicate the continuation of the times. This is the same for the other medical examination items 12B to 12D. In addition, the times available for appointments after the completion of each medical examination are indicated with vertical lines.

FIG. 3 shows a detailed configuration example in the case that the scheduler 111 shown in FIG. 1 makes an appointment by

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utilizing the waiting queue means 115 for individual patients and the waiting queue means 114 for individual medical examination items. In FIG. 3 idn represents a new patient who ~~makes~~ schedules an appointment for a medical examination at this time. The scheduler manages the waiting line queue so that a patient can receive the medical examination in the order starting from the earliest of the times T_{wa} to T_{wd} ($T_{wc} < T_{wd} < T_{wb} < T_{wa}$) which are possible available for appointment for each medical examination item of the waiting queue 114Q for the medical examination items 12A to 12D shown in FIG. 2. In addition, in FIG. 3 time for the first medical examination appointment item 12C is calculated from the time T_{wc} when the next appointment can be ~~made~~ scheduled and the times of the second and subsequent medical examination items are sequentially confirmed by updating times (T_{wd} , T_{wb} , T_{wa}) at which the next appointment can be ~~made~~ scheduled under the condition of completion time T_{com} of the medical examination item of the previously confirmed stage and by starting from the medical examination item of the earliest time. In FIG. 3, "max" shows a time that is the later of the two inputs while "min" shows a time that is the earlier of the two inputs. The conditions of the completion time T_{com} , and later, of the medical examination item of the previous stage at and after the second item are made to be "matched" in the case that where an

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appointment is possible. In the case of a match, the appointment is completed where the queue for individual medical examination items is confirmed by means of the queue means 114. ~~Or, in~~ In the case that there is not a match, rearrangement is again carried out with a return arrow and the process is repeated until an appointment becomes possible. --

Please substitute the paragraph beginning at page 12, line 3 and ending at page 13, line 7 to read as follows:

-- FIG. 4 shows an appointment condition of the waiting queue 114Q for individual medical examination items shown in FIG. 2 after an appointment is ~~made~~ scheduled for a patient idn by the scheduler 111 shown in FIG. 3.

In the appointment process of the patient idn of FIG. 4, since in the original waiting queue 114Q shown in FIG. 2, the sequential order of the time T_{wa} to T_{wd} when the next appointment can be ~~made~~ scheduled after each of the medical examination items 12A to 12D is $T_{wc} < T_{wd} < T_{wb} < T_{wa}$, the first item is confirmed as the medical examination item 12C. Even under the condition after the medical examination completion time of the confirmed medical examination items 12C, the order of the times when the next appointment is available does not change and is the order of

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Tw_d < Tw_b < Tw_a. Therefore, the second item of the medical examination is confirmed as 12D. The time when the next appointment is possible under the condition after the medical examination completion time of the confirmed medical examination item 12D is the time after the completion time of the final patient id5 of the medical examination item 12B and, therefore, becomes the completion time of 12D and the medical examination item 12A does not have a change and becomes Tw_b < Tw_a so that the medical examination item is confirmed as 12B at the changed time. The final 12A becomes the final time of the medical examination item 12B since as for the time when an appointment is possible under the condition after the medical examination completion time of the confirmed 12B, Tw_b is the time at, and after, the completion time of the final patient id7 and this value is confirmed. --

Please substitute the paragraph beginning at page 18, line 6 and ending at page 19, line 2 to read as follows:

-- Here, in the case that it is not determined to be "matched", the process for returning to the candidate detection process is again carried out after the time for which the next appointment is available with respect to each of the entirety of

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the unconfirmed medical examination items is temporarily changed by adding the condition after the completion time of the appointment time confirmed at the previous stage in Step S9. The second medical examination item in the waiting queue 114Q shown in FIG. 2 is confirmed at 12D. In the case that the medical examination item for which the starting time is the earliest from among the times (Twa, Twb) for which the next appointment is available with respect to each of the unconfirmed medical examination items (12A, 12B) is ~~made~~ scheduled to be the third medical examination appointment item, it is not determined to be "matched" when the time Twb for which the next appointment is available of the medical examination item 12B is ~~made~~ scheduled to be ~~[[a]]~~ an appointment time candidate. Therefore, the temporary update processing of the times (Twa, Twb) for which the next appointment is available is carried out resulting in Twb being shifted back one medical examination time. --

Please substitute the paragraph beginning at page 19, line 16 and ending at page 20, line 15 to read as follows:

-- In the case that the time for which the next appointment is available has not been determined to be "matched" so as to be temporarily changed, and the time for which the next appointment

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is available is utilized, a physically vacant time is generated between the completion time of the appointment of the final patient in the original medical examination item queue and the time for which the next appointment is available. In order to effectively utilize this vacant time, it is determined whether or not the vacant time has the interval of an integer times, or more, of the average medical examination time of the medical examination item in Step S11. In the case that there is such an interval, an insertion process of the empty id is carried out in Step S12. The third medical examination appointment item, only, is not determined to be "matched" in the waiting queue 114Q shown in FIG. 2, only in the case that the time Twb for which the next appointment is available of medical examination item 12B is ~~made~~ scheduled to be an appointment time candidate. Therefore, a temporary update process of the time (Twa, Twb) for which next appointment is available is carried out. Consequently, since Twb has been shifted back one medical examination time unit, the determination process where the insertion of the empty id is unnecessary becomes NG and the insertion process of one empty id becomes necessary only for the medical examination item 12B. --

Please substitute the paragraph beginning at page 21, line 8 and ending at page 23, line 19 to read as follows: . .

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-- FIG. 5 illustrates the situation where isolated empty ids are replaced with void ids which cannot be utilized again so as to shorten the medical examination time by suppressing the effects thereof so that no patient who has ~~made~~ scheduled an appointment has a long medical examination time due to the occurrence of isolated empty ids because of the dispersion of the time intervals of the average medical examination time T_a to T_d of the medical examination items 12A to 12D shown in FIG. 2.

Now, in the case that the lead of the time for which the appointment is available is an isolated empty id for each patient, the maximum medical examination time is assumed to be set in advance at, for example, T_0 , or less. In FIG. 5 there is an isolated empty id at the second item of the queue of the medical examination item 12C and the time T_{wc} for which the next appointment is available indicates the time of this leading empty id and the times T_{wd} , T_{wb} , T_{wa} for which the next appointments are available for the other medical examination items 12D, 12B, 12A indicate the times immediately after the final patients id_3 , id_5 , id_7 , respectively. Therefore, the appointment process of the patient idx of this time has the order of 12C, 12D, 12B, and 12A. At this time, an empty id is inserted immediately after the final patient id_5 of the medical examination item 12B in the

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route (1) according to the order and the medical examination time of the patient idx becomes $T1 (> T0)$. This medical examination time $T1$ is equal to, or larger than, the medical examination time $T0$ that has been decided in advance and this appointment process is not confirmed because the first medical examination item 12C starts from the empty id. Therefore, this empty id is converted to a void id that cannot be utilized again so that the waiting time Twc of the medical examination item 12C is updated to the time immediately after the patient id4 that is the time for which the next appointment is available and the appointment process is repeated again. Then, an appointment is assumed to be ~~made~~ scheduled for a new patient in the order of 12D, 12C, 12B, and 12A of idy the order becomes along the route (2) wherein empty ids are inserted immediately after the patient id4 of the medical examination item 12C and immediately after the patient id5 of the medical examination item 12B and the medical examination time is shortened to $T2$. In the case that this medical examination time $T2$ is the constant medical examination time $T0$, or less, and the first medical examination item 12D is not an empty id, the entire appointment process is confirmed in this route (2) from these two.

Next, cancellation by the scheduler is described. When there is an application of cancellation of the medical

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examination appointment, in the case that there is not confirmation of the patient a constant time before the appointment time of the first medical examination item of the waiting queue for individual patients corresponding to the patient or in the case that there is an application for cancellation by the patient before that, then the waiting queue for individual patients for this patient is eliminated. Then, all of the patients who are queued in the waiting queue means 114 for individual medical examination items are moved to an empty queue so that reappointments for this time become possible. In addition, cancellation notices are given to the patients who have not yet ~~made~~ scheduled appointments and appointment change notices are given to the patients who have already ~~made~~ scheduled appointments. --

Please substitute the paragraph beginning at page 24, line 18 and ending at page 25, line 5 to read as follows:

-- Now, when a patient receives a wireless display device 1131, the wireless display device 1131 reads out the medical examination appointment contents of the corresponding idn of the waiting queue 115Q of the scheduler means 111 which have been registered at the reception and forms medical examination guidance

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information that indicates the route, the starting and finishing time and a map of the premises on one of the virtual reality displays 112. Then, the data are transmitted to the corresponding wireless display device 1131 so as to be displayed and the guidance information is updated whenever a medical examination item is completed. --

Please substitute the paragraph beginning at page 26, line 13 and ending at page 28, line 7 to read as follows:

-- In FIG. 11, the status of progress shows the patients who are undergoing medical examination and the medical examination appointment list remaining in the waiting queue means 115 for individual medical examination items of the server 11 shown in FIG. 1. In the case that the patients who are confirming the status of progress have already ~~made~~ scheduled an appointment, their own appointment queue is reversed so as to display the appointment times for individual medical examination items 12A to 12D of the patients. In the case that the patients who are confirming the status of progress have not yet ~~made~~ scheduled an appointment, the times Twa to Twd for which the next appointments are available of the waiting queue means 114, which include conventional empty ids, are represented. The lower portion of

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FIG. 11 shows the situation where the total number of patients N_t who are to receive a medical examination on that day, the number of patients N_c who have already completed the medical examination and have been eliminated from the waiting queue means 114, the number of patients N_p who are at present undergoing medical examination and who are marked, the number of patients N_{ap} who have already ~~made~~ scheduled an appointment and the number of patients N_{nap} who have not yet ~~made~~ scheduled an appointment are displayed.

As described in detail above, according to the medical examination system of the present application, which has a simple configuration and portability, in the case of an on-site medical examination with the presupposition that the patients undergo medical examination during working hours, an appointment can be ~~made~~ scheduled for an individual medical examination in a manner where the entire medical examination time becomes of the minimum grasping the status of progress of the medical examination of an office room or workplace where work is carried out. In addition, even in the case that the places, layout and the order for the medical examination have changed due to the installation conditions, guidance for the necessary medical examination order and for the medical examination place can be carried out based on the appointment conditions for individual patients by means of a

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wireless display device at the medical examination site.

Accordingly, it becomes possible to provide a medical examination system wherein amount of time of interruption of work by the medical examination can be kept to a minimum and patients can undergo medical examination without becoming confused concerning the route of a medical examination at an unfamiliar site. --